Project Fact Sheet

Improved Heat Exchanger Surfaces To Reduce Fouling in Tomato and Fruit Juice Processing

GOALS

- Evaluate the effectiveness of Ni-P-PTFE coating on heat exchanger surfaces to reduce fouling during hearting of dairy products and fruit and vegetable juices.
- Compare standard stainless heat exchangers with coated heat exchangers by measuring heat transfer and pressure drop characteristics.
- Validate possible thermal and electrical energy savings.
- Investigate the peeling of the coating and device methodology for its prevention.

PROJECT DESCRIPTION

Heating of liquids is a common unit operation in the food industry, e.g. pasteurization of liquid milk and concentration of fruit and vegetable juices. Thermal instability of food components results in formation of fouling layers in food processing equipment.

Fouling increases thermal energy use by decreasing heat transfer coefficient and increases electrical energy use by increasing pressure drop along the heat exchanger. Fouling further increases both thermal and electrical energy consumption by increasing frequency and duration of cleaning operations.

This project will conduct laboratory experiments to evaluate the effectiveness of Ni-P-PTFE coating on heat exchanger surfaces to reduce fouling during heating of dairy products and fruit and vegetable juices.

SITE BENEFIT

A typical pasteurized liquid milk plant processing 120,000 gallons per day is estimated to save 150,000 kWh of electricity and 63,000 therms of natural gas based on 50% reduction in fouling related energy consumption.

Evaporator Section

INDUSTRY BENEFIT

California has over 100 plants processing over 35 billion pounds of milk annually and accounts for over 10% of milk production in the United States. California is also a major producer of fruit and tomato juices. These industries also stand to be benefited by this technology. When fully adopted the technology could save 15,000 MWh of electricity and 6,300 Kilo therms of natural gas.

FUNDING AMOUNT

Project Cost: is $229,068
Public Interest Energy Research Program Contribution $210,500 (92%)

FOR MORE INFORMATION

Jatal D. Mannapperuma CIFAR, University of California, Davis (530) 752-8559 jdmannapperuma@ucdavis.edu **Pramod Kulkarni** California Energy Commission (916) 654-4637 pkulkarn@energy.state.ca.us	**Virendra M. Puri** Pennsylvania State University (814) 863-1031 vmpuri@psu.edu